$=2025.10^{-6}J$

A t=30ms

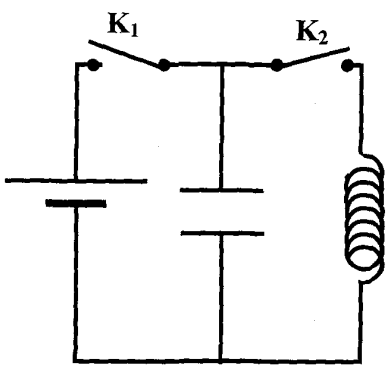
$$E = E_C + E_L + = E_{Cm} = \frac{1}{2}CU_C^2 + \frac{1}{2}Li^2 = \frac{1}{2}CU_C^2 + \frac{1}{2}L(\frac{u_R}{R})^2$$

$$E = \frac{1}{2}50.10^{-6}.(2,25)^2 + \frac{1}{2}(0,35)(\frac{-0,3}{20.10^3})^2 = 165,9375.10^{-6}J$$

$$|\Delta E| = 2025.10^{-6} - 165,9375.10^{-6} = 1859,06.10^{-6}J$$

Exercice N°2 :

1°)



2°)Lois des mailles : $u_C + u_L = 0$

$$\Rightarrow \frac{q}{C} + L\frac{di}{dt} = 0 \Rightarrow \frac{q}{C} + L\frac{d^2q}{dt^2} = 0$$

$$\Rightarrow \frac{d^2q}{dt^2} + \frac{1}{LC}q = 0$$

3°) $q = Q_m \sin(\omega_0 t + \varphi)$

$$\frac{d^2q}{dt^2} = -\omega_0^2 Q_m \sin(\omega_0 t + \varphi)$$

$$-\omega_0^2 Q_m \sin(\omega_0 t + \varphi) + \frac{1}{LC}Q_m \sin(\omega_0 t + \varphi) = 0$$

$$\Rightarrow Q_m \sin(\omega_0 t + \varphi).\left(-\omega_0^2 + \frac{1}{LC}\right) = 0$$

$$\Rightarrow -\omega_0^2 + \frac{1}{LC} = 0 \Rightarrow \omega_0 = \sqrt{\frac{1}{LC}}$$

4°)

a- $E = \frac{1}{2C}q^2 + \frac{1}{2}Li^2$

$$\frac{dE}{dt} = \frac{1}{C}q\frac{dq}{dt} + Li\frac{di}{dt} = i\underbrace{\left(L\frac{di}{dt} + \frac{q}{C}\right)}_{=0}$$

$$\frac{dE}{dt} = 0 \Rightarrow E = \text{constante}$$

$E = E_{Lm} = 2.10^{-3}J$

b- $T_0 = 2T = 4\pi.10^{-4}s$

- $\omega_0 = \frac{2\pi}{T_0} = \frac{2\pi}{4\pi\pi.1^{-4}} = 5.10^3 rad.s^{-1}$
- $I_m = \omega_0.Q_m \Rightarrow Q_m = \frac{I_m}{\omega_0} = \frac{2}{5.10^3} = 0,4.10^{-3}C$
- $E_{L_m} = \frac{1}{2}LI_m^2 \Rightarrow L = \frac{2E_{L_m}}{I_m^2} = \frac{2.2.10^{-3}}{4} = 10^{-3}H$

$L=10^{-3}H$